

ADVANCE PROOF—(Subject to revision).

This proof is sent to you for discussion only, and on the express understanding that it is not to be used for any other purpose whatever.—(See Sec. 47 of the Constitution).

Canadian Society of Civil Engineers.

INCORPORATED 1887.

TRANSACTIONS.

N.B.—This Society, as a body, does not hold itself responsible for the facts and opinions stated in any of its publications.

CONCUSSION IN SEWER PIPES.

BY E. MOHUN, M.CAN. Soc.C.E.

To be read Thursday, Jan. 18th, 1894.

The writer desires to lay before you what he believes to be an unrecognised source of danger to pipes, under certain conditions, during the construction of sewers.

In Victoria, B.C., about 2000 feet of 20 inch pipe were laid, and before many weeks had elapsed it was found that a very considerable number were broken.

Examination showed that near a ventilator or a manhole on a straight line the pipes were intact; while in a manhole on a curve they were sometimes fractured. In rock tunnel, where there was open space above the pipes and clear entrance to a manhole, the pipes were undamaged, while when laid in earth, near which blasting had been necessary, they were often cracked.

The natural inference in the first place was, of course, that this result was due to improper laying and insufficient tamping; but it was felt that the damage could not be attributed to such a cause.

The pipes had been tested for crushing (while unsupported at the sides) up to 2500 lbs. per lineal foot without fracture; an inspector was present when each pipe was laid, whose duty it was to see the back filling properly tamped, while the work was frequently visited, at uncertain intervals, by the engineers and chief inspector. Further, it was found that in work performed by the same men, when the superincumbent weight was far in excess of that above the broken pipes, no damage had been done.

Mr. G. A. Keefer, Mr. E. A. Wilmot, Mr. E. G. Tilton and the writer finally came to the conclusion that the damage arose from concussion caused by the blasting in the trenches and tunnels beyond where the pipes had been laid, and this conclusion appeared to be justified by the facts before narrated.

It should be explained that between 60 and 70 p. c. of this pipe was laid through solid trap rock, nearly all in tunnel. The rock was intensely hard; with a day and night shift the progress was only 5 feet a week to the face. The charges were heavy and the air was naturally driven out of the tunnel with great force.

Since the discovery was made, all pipes in the neighbourhood of blasting have been stopped at their upper ends and covered with sacks of earth, and no pipe has been laid into the lower end of a tunnel until the latter had been driven through. These precautions proved successful and no further damage was done.

The total cost of replacing the injured pipes was about \$1700, which was paid by the contractor before the final acceptance of the work.

The writer has often heard of sewer pipes being found broken after the work had been taken off the contractor's hands, the cost in these cases falling upon the City, and the blame upon the contractor. Is it not possible that in some instances, at all events, the breakage might be due to concussion?